AD NUMBER

AD835836

NEW LIMITATION CHANGE

TO

Approved for public release, distribution unlimited

FROM

Distribution authorized to U.S. Gov't. agencies and their contractors; Critical Technology; 21 MAR 1966. Other requests shall be referred to Army Biological Laboratory, Attn: TID [Technical Release Branch], Fort Detrick, MD 21701.

AUTHORITY

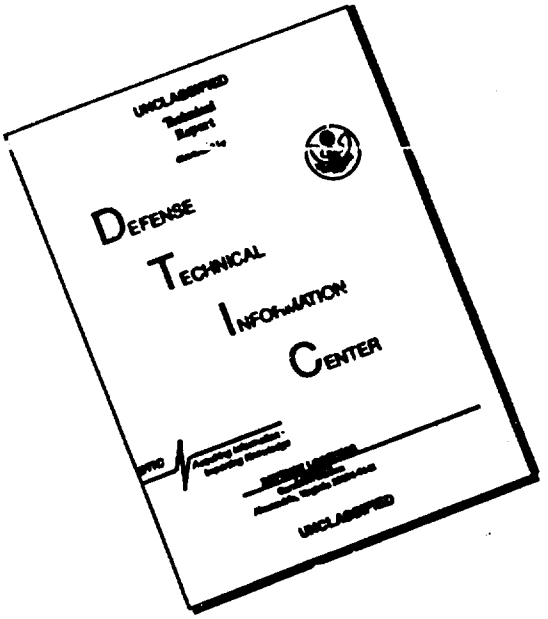
31 Mar 1978, SMUFD

TRANSLATION NO. 1697

[redacted]

DATE: 31 March 1966

DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

ON THE RELATION BETWEEN THE KINDS OF WINTER CROPS AND THE OCCURRENCE OF THE BACTERIAL LEAF BLIGHT OF RICE PLANT

Kyushu Nogyo Kenkyu
(Kyushu Agricultural Research)
No. 19, March 1957, pp 64 - 66

T. Kiryu and S. Kuhara of the Kyushu Agricultural Experiment Station

Since the different varieties of winter crops, according to the inherent characteristics of the crops and the differences in the cultivation methods, cause the prerequisite of weather conditions at the fields, the physical characteristics of the soil and the changes in the living-environment, it can be thought that passing through these differences the winter crops participate in the survival of the bacteria on the crops or the environs of the crops, or influence the plants growing in the post-winter crop fields and thus participate in the outbreak of rice leaf blight.

The present report, as a part of the research in 1954 on the ecology of rice leaf blight, is the result of an investigation to determine whether there was a difference in the occurrence of rice leaf blight on the post-winter crop-fields according to the variety of winter crops. As far as the experiments were concerned, in order to make comparisons under similar environmental conditions including such topographic features as rice plant variety which was thought to have relationship to the outbreak of rice leaf blight, cultivation procedures, flooding, wind and drainage systems, the winter crops were different from each other, two adjoining paddy fields were taken as one specimen and comparison was made on the extent of blight outbreak on the two paddy fields as a group. Furthermore, care was taken to note whether the rice plant varieties in the two fields of the group as well as the tiller of the field were the same. In this type of actual field test, since the predisposing environmental factors which participate in the outbreak of blight may at the same time determine the most suitable variety of winter crops, even if the outbreak were large in a certain post-winter crop-field, it probably cannot be said to be the direct effect of the winter crop variety. Accordingly, the present investigation was terminated at the point of determining whether a relationship existed between the winter crop variety and rice leaf blight outbreak.

Experimental Method

On May 26, 1954, at all places in Fukuoka Prefecture, Mii district, Ogun cho, Misaka (formerly Misaka village) where the disease usually occurred, with different varieties of winter crops and where if it existed, two adjacent paddies were taken as a unit, the planting of winter crops was investigated by means of mapping the positions. On October 11th and 12th an examination of blight outbreak and plant varieties was started in the paddies. In November and December, a listing of the farmers was made. As far as sampling was concerned, in a situation as I, II and III of Figure 1, the field with winter crop variety B was grouped with a paddy containing variety A randomly chosen from one of the four adjacent paddies. It was decided to make random choices to form groups as in IV where a unit could be formed from top-bottom or left-right, and in V where a unit could be formed from A and B or A and C. Furthermore, even where a different variety of

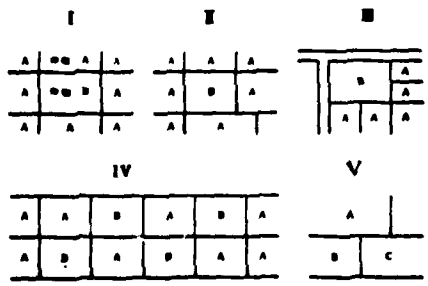


Figure 1. Model of Paddies With Different Winter Crops

winter crop was partially cultivated in the same paddy, this was taken as a sample when the proportion occupied by the crop was not limited to a small amount. The examination for bl[illegible]s made on all groups by taking 20 stalks along the boundary, two [illegible] removed from near the center of the boundary line* of two paddies. [illegible]nod was as follows: On all stalks counting from the top with no bli[illegible]own to the third leaf was zero; when the sum of the blight area was less than 1/3 of all the leaf area examined, the index was 1/6 and the number of stalks was designated a; similarly when it was more than 1/3 but less than 2/3, the index was 3/6 and the number of stalks was b; when greater than 2/3, the index was 5/6 and the number of stalks designated as c; when the entire leaf area examined was devoid of any green color, this was indexed as 1 and the number of stalks as d. Representing the total stalks counted as n, the following was obtained:

* The boundary measured 30 - 40 cm wide.

$$\text{Blight Outbreak} = \frac{1}{n}\,(a/6 + 3b/6 + 5c/6 + d) \times 100$$

Experimental Results and Discussion

The number of groups examined as specimen was 149 and there were 114 farmers involved. Of the 149 groups, the groups with identical plant variety were 78, the number of groups with the same farmer was 69, and the number of groups with identical plant variety and the same farmer was 55. There were 20 varieties of wet-field rice plants in all and 9 varieties of winter crop plants. The winter crops consisted mainly of the groups formed from wheat, rye and rapeseed. The rice plant variety and number of wet-field paddies are shown in Table 1.

(1) 稲品種	水田筆数 (2)	割合 %(3)
(4)十石	26	8.7
(5)宝	14	4.4
(6)農林18号	21	7.0
(7)紅千石	35	11.7
(8)赤ザカエ	8	2.6
(9)栄金丸	10	3.3
(10)ネンキ	76	25.5
(11)農林27号	52	17.4
(12)伊万里1号	10	3.3
(13)農林37号	13	4.3
(14)旭	3	1.0
(15)神山	1	0.3
(16)中千石	3	1.0
(17)太郎兵衛稲	5	1.6
(18)権太稲	1	0.3
(19)稲(在来)	12	4.0
(20)農林稲5号	4	1.3
(21)農林12号	2	0.6
(22)陸1号	1	0.3
(23)陸2号	1	0.3

Table 1. Rice Plant Variety and Number of Wet-Field Paddies

1) Plant Variety
2) Number of Paddies
3) Proportion
4) Toseki
5) Takara
6) Agriculture and Forestry #18
7) Benisengoku
8) Hozakae

9) Ogonmaru
10) Kinki
11) Agriculture & Forestry #27
12) Imansato #1
13) Agriculture & Forestry #37
14) Asahi
15) Kamiyama
16) Nakasengoku
17) Tarohei mochigome
18) Kenta mochigome
19) Mochigome (traditional)
20) Agriculture & Forestry #5
21) Agriculture & Forestry #12
22) Oka #1
23) Oka #2

If it is considered that all places which were selected as groups from the zones investigated in the entire area are randomly scattered, then it appears the greater proportion of plant variety shown by this investigation consisted of the variety cultivated at the Misaka area in the zone where an outbreak usually occurs. According to Table 1, the order was as follows: the largest was Kinki* which was 25%, then the Agriculture and Forestry #27 at 17%, Benisengoku at 10%, Toseki and Agriculture and Forestry #18. However, the Kinki variety which is strongly resistant to the disease as is the Agriculture and Forestry #18 which has an intermediate resistance amounted to 66%. In general, it appears that the varieties cultivated in this area are mostly resistant to this blight.

The average values of the blight outbreak in post-winter crop-fields of the crop varieties adjacent to each other are shown in Table 2, 3 and 4. Table 2 shows the average blight outbreak for the entire groups investigated; Table 3 only of those groups where the rice variety was the same and Table 4 is that of the groups where both the plant variety and the farmers were the same. The difference in the extent of blight outbreak in the post-winter crop-fields was examined according to the t test.

When the results are correlated, it can be said that the outbreak of blight in the post-winter crop-fields is greater in the case of rapeseed and broad beans rather than wheat or rye and that the outbreak with the radish (rapeseed use) is greater than with rye. The large disparity in Table 2 between broad bean and rapeseed was reduced in Table 3 and this is attributed to the mutual comparison made on identical rice plant variety and thus the effect of rice plant varieties has been eliminated. Furthermore, since there may be differences among the winter crops, this may extend to some degree to the outbreak of blight on the winter crops. However, since the number of samples were small, this was not clarified. Moreover, the large disparity in the groups wheat-broad bean and rye-radish can also be thought of as being due to insufficient specimens.

* According to the records, "Kinki" is the name applied in this area and its cultivation began around 1950. Before that, its history is unknown. Its sprouting period, maturing period and shape resemble Agriculture and Forestry #27 a great deal. Its high resistance to the blight is also similar.

(1) 裏作物の種類	(2) 紋枯病発病度 (A)	(B)	(3) 組数
(4) 小麦・休地	19.58	44.16	2
(6) 小麦・紫雲英(5)	13.10	24.08	11
小麦・馬鈴薯(7)	12.18	25.10	8
(8) 小麦・大根	28.49	51.11	3
小麦・菜種(9)	16.31	28.54**	50
(10) 裸麦・裸麦	21.96	14.99	11
裸麦・休地(11)	37.91	69.99	2
(12) 裸麦・甘藍	15.83	40.00	1
裸麦・蚕豆(13)	13.74	26.72*	16
(14) 裸麦・紫雲英	7.50	61.66	1
裸麦・馬鈴薯(15)	5.83	9.16	1
(16) 裸麦・大根	10.53	24.64*	14
裸麦・菜種(17)	10.22	24.00**	21
(18) 菜種・蚕豆	29.36	25.83	3
菜種・紫雲英(19)	32.50	36.33	1
(20) 菜種・大根	12.50	4.16	1
大根・蚕豆(21)	8.33	23.33	1

(22)註) *, ** はそれぞれ5%, 及び1%の水準で有意であることを示す. (以下第3表, 4表何れも同様である)

Table 2. Extent of Rice Plant Leaf Blight in Post Winter Crop-Fields (All groups investigated)

1) Variety of Winter Crops
2) Extent of Blight
3) Number of Groups
4) Wheat - Fallow Field
5) " - Broad Bean
6) " - Purple Vetch
7) " - Potato
8) " - Radish
9) " - Rape Seed
10) " - Rye
11) Rye - Fallow Field
12) " - Cabbage
13) " - Broad Bean
14) " - Purple Vetch
15) " - Potato
16) " - Radish
17) " - Rapeseed
18) Rapeseed - Broad Bean
19) " - Purple Vetch
20) " - Radish
21) Radish - Broad Bean
22) Note: *, ** represent 5% and 1% confidence levels (same for Tables 3 and 4)

(1)裏作物の種類	(2)稲白葉枯病発病度 (A)	(B)	組数(3)
(4) (A) (B) 小麦・蚕豆	8.21	23.21*	7
小麦・紫雲英 (5)	9.16	31.66	2
(6) 小麦・馬鈴薯	28.49	51.11	3
小麦・菜種 (7)	13.29	20.47**	26
(8) 小麦・裸麦	18.16	7.33	5
裸麦・甘藍 (9)	15.83	40.00	1
(10) 裸麦・蚕豆	13.70	24.76**	11
裸麦・馬鈴薯 (11)	5.83	9.16	1
(12) 裸麦・大根	11.66	18.83*	5
裸麦・菜種 (13)	10.41	26.66**	12
(14) 菜種・蚕豆	29.38	25.83	3
菜種・大根 (15)	12.50	4.16	1
(16) 大根・蚕豆	8.33	23.33	1

Table 3. Extent of Rice Plant Leaf Blight Outbreak in Post Winter Crop-Fields (Only from groups with the same plant variety)

1) Winter Crop Variety
2) Extent of Blight Outbreak
3) Number of Groups
4) Wheat - Broad Bean
5) " - Purple Vetch
6) " - Potato
7) " - Rapeseed
8) " - Rye
9) Rye - Cabbage
10) " - Broad Bean
11) " - Potato
12) " - Radish
13) " - Rapeseed
14) Rapeseed - Broad Bean
15) " - Radish
16) Radish - Broad Bean

(1)裏作物の種類	(2)稻白葉枯病発病度 (A)	(B)	組数(3)
(4) 小麦・蚕豆	2.49	7.49	3
小麦・紫雲英(5)	10.83	10.00	1
(6) 小麦・馬鈴薯	28.49	51.11	3
小麦・菜種(7)	14.78	28.74**	20
(8) 小麦・裸麦	21.45	8.75	4
裸麦・甘藍(9)	15.83	40.00	1
(10) 裸麦・蚕豆	14.91	25.83**	10
裸麦・馬鈴薯(11)	5.83	9.16	1
(12) 裸麦・大根	25.83	46.66	1
裸麦・菜種(13)	13.74	23.05*	6
(14) 菜種・蚕豆	29.38	25.83	3
菜種・大根(15)	12.50	4.16	1
(16) 大根・蚕豆	8.33	23.33	1

Table 4. Extent of Rice Plant Leaf Blight in Post Winter Crop-Fields (Only of groups with the same variety and same farmers).

1) Variety of Winter Crops
2) Extent of Leaf Blight
3) Number of Groups
4) Wheat - Broad Bean
5) " - Purple Vetch
6) " - Potato
7) " - Rapeseed
8) " - Rye
9) Rye - Cabbage
10) " - Broad Bean
11) " - Potato
12) " - Radish
13) " - Rapeseed
14) Rapeseed - Broad Bean
15) " - Radish
16) Radish - Broad Bean

The reason for the manner in which the blight outbreak occurred-less in the wheat and rye fields, more in the rapeseed, broad bean and radish (rapeseed use) - must await future investigations. However, the results of investigation in 1953 on the fertilizer for several types of winter crops in these areas are presented in Table 5.

第5表　施肥量調査成績

(1)作　物	(2)窒　素	(3)燐　酸	(4)加　里
(5)菜　種	4.00	0.93	1.83
小　麦(6)	2.55	1.30	1.95
(7)裸　麦	2.33	1.31	1.68
大　根(8)	3.34	1.18	1.90
(9)馬鈴薯	4.66	1.14	2.13
蚕　豆(10)	1.73	1.29	2.66

(11)*施肥の窒素 0.05，燐酸 0.03，加里 0.05，硫安の窒素 0.20，石灰窒素の窒素 0.20，過石の燐酸 0.16，塩化加里の加里 0.45 として計算した．(3ヶ所平均)

Table 5.　Result of Fertilizer Investigation

1) Crop
2) Nitrogen
3) Phosphoric acid
4) Potassium
5) Rapeseed
6) Wheat
7) Rye
8) Radish
9) Potato
10) Broad Bean
11) * Calculated by taking manure nitrogen as 0.05, phosphoric acid 0.03, potassium 0.05, ammonium sulphate nitrogen 0.02, nitrogen in nitrogenous lime 0.20, superphosphate of lime 0.16, potassium in potassium chloride 0.45 (Average from three places).

That is to say that the rapeseed and radish (rapeseed use) have more nitrogen than wheat or rye. Furthermore the fields with rapeseed and broad beans because of fallen leaves and organic matter left on the ground are better fertilized than the fields with wheat and rye. Thus it may be that the excess of nitrogen resulting from this source may be one of the reasons.